INA 703
MAGNETIC FIELD COIL
USER MANUAL

601-335B

TESEQ
Advanced Test Solutions for EMC

INA 703
MAGNETIC FIELD COIL

USER MANUAL

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Lethal danger from high voltages and the risk of radiating illegal electromagnetic interference.

This system must be used only for EMC test purposes as specified in these operating instructions.

The INA 703 must be installed and used only by authorized and trained EMC specialists.

Personnel fitted with a heart pacemaker may not operate the instrument and must not be in the vicinity of the test setup while it is in operation.

When the system is used in conjunction with options, accessories or other equipment the safety instructions concerning those devices must also be observed.

1 EXPLANATION OF SYMBOLS

Please take note of the following explanations of the symbols used in order to achieve the optimum benefit from this manual and to ensure safety during operation of the equipment.

The following symbol draws your attention to a circumstance where non-observation of the warning could lead to inconvenience or impairment in the performance.

Example:

This connection must not be confused with the Equipment under Test (EUT) power input.

The following symbol draws your attention to a circumstance where non-observation of the warning could lead to component damage or danger to the operating personnel.

Example:

Never connect or disconnect the EUT while the test system is performing a test.

2 INTRODUCTION

2.1 General description

INA 703 is the top end of a family of magnetic field coils, designed for testing per IEC 61000-4-8 (supply frequency magnetic fields).

Thanks to a multi wire - 37 turns – concept , it allows the generation of fields higher than 1000 A/m while using a current source rated for 30 A, so insures the possibility to meet the IEC 61000-4-8 standards requirement of a current THD < 8% which can be met only when using a synthetic current source.

INA 703 has a connection possibility after wire turn 1 and turn 5, which allows to reach great accuracy when generating low amplitude fields.

For tests per IEC 61000-4-8, INA 703 can be used as an accessory to the Teseq profline system, together with a NSG 1007- 5 kVA source, the INA 2141 impedance box and the WIN 2120 software can generate supply frequency fields (50 and 60 Hz) up to 330 A/m continuously and 1100 A/m short term (3 s).

It can also be used with the MFO 6501 or 6502 current sources and the NSG 3000 series of generators and generate Supply frequency fields (50 and 60 Hz) up to 120 A/m continuously and 120 A/m short term (3 s).

Thanks to the multi wire concept and to the sophisticated mechanical design, like the U-shaped base on rolls which allows convenient approach and positioning to the test table, INA 703 is the ideal accessory for magnetic field testing.

2.2 Supply frequency magnetic fields

Supply frequency magnetic field tests, simulate the magnetic fields typically generated by the current flow in power supply cables as specified in IEC/EN 61000-4-8. Such magnetic fields can affect the operation of items of equipment that are sensitive to them.

For testing to IEC 61000-4-8, the INA 703 needs to be supplied by a regulated 50 or 60 Hz current (THD<8%) of maximum 10 A continuously and 35 A short term (<5 s).

Single turn, 5 turns , and 37 turns can be selected in order to reach high fields with low currents, but maintaining good resolution for lower fields testing.

The Teseq ProfLine system comprising an NSG 1007- 5 kVA source, an INA 2141 impedance box and WIN 2120 software is ideally suited for this application. For this setup the interconnection cable INA 3250 is required.

The system can generate supply frequency fields (50 and 60 Hz) up to 330 A/m continuously and 1100 A/m short term (3 s).

For more information please consult ProflLne 2100 series user documentation.

8 The INA 703 can also be used with the Teseq MFO 6501 or 6502 current sources and the NSG 3000 series of generators to generate supply frequency fields (50 and 60 Hz) up to 120 A/m continuously and 120 A/m short term (3 s). For this setup the interconnection cable INA 3251 is required.

For more information please consult MFO 6501/2 or NSG 3040 series user manuals.

3 USER INSTRUCTIONS

WARNING - Improper or careless operation can be fatal!
These operating instructions form an essential part of the equipment and must be available to the operator at all times. The user must obey all safety instructions and warnings.

Neither Teseq AG, Luterbach, Switzerland, nor any of its subsidiary sales organisations can accept any liability for personal, material or consequential injury, loss or damage that may result from improper use of equipment and accessories.

3.1 General

The INA 703 together with the adequate generator must be operated only by authorized and trained specialists. The generator with the coil is to be used only for the purpose specified by the manufacturer. The user is directly responsible for ensuring that the test setup does not cause excessive radiated interference which could affect other instrumentation or human beings. The test system itself does produce EM radiation up to 1100 A/m .

WARNING - Personnel fitted with a heart pacemaker must neither operate the instrument nor approach the test setup while a test is being executed.

Only approved accessories, connectors, adapters, etc. are to be used to ensure safe operation.

3.2 Unpacking and installation

Check the packaging for signs of damage in transit. Any damage should be reported immediately to the transportation company.

INA 703 is delivered dismantled, safely packed in a solid wooden box.

Identify the upper side of the box and remove cover after having removed the screws.

The contents of the package will look like:

Unpack carefully the various parts. Check the parts for signs of transport damage. Any damage should be reported to the transportation company immediately.

Screw the vertical bars to the rolling base.

Lift (2 persons) the coil (red part) over the base, slide the black fixtures into the vertical bars.

Secure the coil by fastening the fixtures to the bar.

The INA 703 is now ready to be rolled around to the test setup.

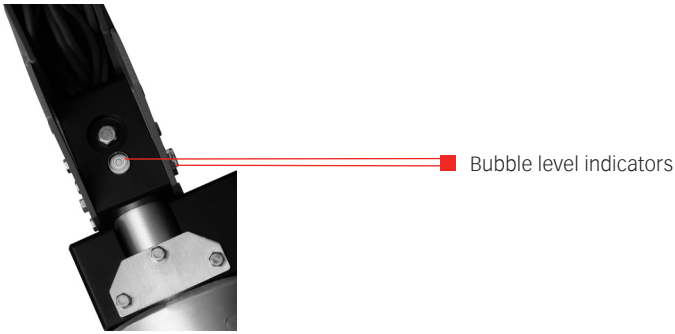
NOTE! Do not dispose of packaging materials. All packaging should be retained in the event that the instrument or any of its accessories should need to be returned to a Teseq service center for repair or calibration.

3.3 Positioning

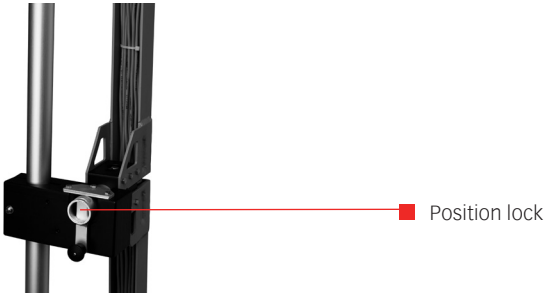
The U-shaped base with castors will allow easy positioning of the INA 703 to the EUT, even if this one is placed on a test table.

The equipment to be tested shall always be positioned in the geometric center of the red coil part

Tests need to be done with the coil in horizontal position and then in vertical position, 2 bubble level indicators as shown in picture below will facilitate the right positioning.



Securing in horizontal and vertical position goes easy thank to the positioning lock:



NOTE! Standards require only testing for horizontal or vertical position. INA 703 positioning lock has an intermediate position at 45 ° which may be used for investigation purposes.

3.4 Connection to the generator

The INA 703 features a multipole terminal system which insures comfortable and safe connection of various generators suited for various applications

Round 4 pole connector:

The pole marked with PE sign is connected together with the black banana to the low entry of the coil.

Pole Nr. 1 is connected together with the red banana to the end of turn Nr. 1

Pole Nr. 2 is connected to the end of turn Nr. 5

Pole Nr. 3 is connected to the end of turn Nr. 37

3.4.1 Connecting to Teseq ProfLine system for IEC 61000-4-8 testing

An INA 3250 interconnection cable is required. Connect the INA 3250 interconnection cable directly from the 4 pole connector of INA 703 to INA 2141 of ProfLine system.

The setting of the various levels and frequencies of supply frequency magnetic fields is supported comfortably by the WIN 2120 software.

INA 2141 features 3 ranges (red selector on INA 2141 front: Position 0= Off, position 1 = 1 turn, position 2= 5 turns, position 3 = 37 turns) for better accuracy of low level magnetic fields.

For each of the 3 ranges a separate coil factor (the coil factor is available in the INA 703 calibration certificate and is also labelled on INA 703 terminal unit) needs to be used. In the WIN 2120 software configuration file the INA 703 needs to be configured as 3 separate coils.

For more information please consult the ProfLine systems user documentation.

3.4.2 Connecting to Teseq MFO 6501 or MFO 6502 for IEC 61000-4-8 testing

An INA 3251 interconnection cable is required. Connect the INA 3251 interconnection cable directly from the 4 pole connector of INA 703 to the output of MFO 6501.

The 3 ranges of the INA 703 are selectable by a respective banana plug (Green/yellow = Low, blue = 1 Turn, Black = 5 Turns, red = 37 Turns) for better accuracy of low level magnetic fields.

For each of the 3 ranges a separate coil factor. (The coil factor is available in the INA 703 calibration certificate and is also labelled on INA 703 terminal unit) needs to be used.

For more information please consult the NSG 3040 systems or MFO 6501/2 user documentation.

3.4.3 Connecting to any other generator for IEC 61000-4-8 testing

An INA 3251 interconnection cable is required. Connect the INA 3251 interconnection cable directly from the 4 pole connector of INA 703 to the output of the generator.

The 3 ranges of the INA 703 are selectable by a respective banana plug (Green/yellow = Low, blue = 1 Turn, Black = 5 Turns, red = 37 Turns) for better accuracy of low level magnetic fields.

For each of the 3 ranges a separate coil factor. (The coil factor is available in the INA 703 calibration certificate and is also labelled on INA 703 terminal unit) needs to be used.

Make sure that the maximum ratings of INA 703 are not exceeded – risk of fire.

For Standard compliance testing the generator shall have a THD<8%, this is not permanently guaranteed when solutions based on variacs and step down transformers powered from mains supply are used.

3.5 Test execution

The user must observe safety instruction for all the instruments and associated equipment involved in the test setup.

Test setup configuration is to be strictly in compliance with the methods described in the relevant standard to ensure that the test is executed in a compliant manner

WARNING - Users must be aware of the following dangers that can occur during testing:

It is recommended for the user to stay away (at least a few meters) from the loop antenna while magnetic fields are generated. Also keep away magnetic field sensitive devices and items such as credit cards – magnetic key cards etc… which might be influ-encedby the fields.

The field generated in the loop antenna is directly proportional to the current flowing through it:

Field strength (A/m) H = Cf x I

Where H is the generated field, Cf the coil factor, I the current flowing through the loop.

The use and setting of the generator and associated software is given in the generator user documentation.

4 MAINTENANCE AND FUNCTION CHECK

4.1 General

Maintenance by the user is restricted to visual inspection, cleaning the outer housing, performing a function check and verification of the pulse parameters.

4.2 Cleaning

In general a moist cloth is sufficient for cleaning the outer housingl. If necessary add a small amount of a mild, non-foaming household cleanser.

No chemicals (acid, etc) should be used for cleaning purposes.

Before beginning to clean the test system ensure that it is switched off and the mains power cable is unplugged from the supply.

4.3 Function check

The safety measures described previously must be strictly observed while carrying out a function check.

Functional check of the whole system (generator plus INA 703) can be made by monitoring the current flowing through the INA 703.

This current, multiplied by the coil factor, will give the generated magnetic field.

Supply frequency current may be measured by a RMS ampmeter.

Pulsed and oscillatory currents can be observed with an oscilloscope.

Do not connect the oscilloscope directly in order not to exceed its max. input voltage.

Teseq recommends the use of an oscilloscope together with MD 300 current probe (see paragraph: accessories).

4.4 Calibration

The calibration of a Magnetic field loop is explained in IEC 61000-4-8.

A magnetic field meter is placed in the center of the loop and a reference supply frequency current is generated through the loop. The ratio between the measured magnetic field and the reference current gives the coil factor.

Teseq has a worldwide network of accredited test laboratories specialised in EMC calibrations. **Visit www.teseq.com.**

4.5 Warranty

Teseq grants a warranty of 2 years on this test system, effective from the date of purchase.

During this period, any defective components part will be repaired or replaced free of charge or, if necessary, the test system will be replaced by another of equivalent value. The decision regarding the method of reinstating the functional capability is at the sole discretion of Teseq.

Excluded from the warranty is damage or consequential damage caused through negligent operation or use as well as the replacement of parts subject to degradation.

The warranty is rendered invalid by any intervention on the part of the customer or a third party.

The faulty items have to be returned in their original packaging.

Teseq accept no responsibility for damage in transit.

5 DECLARATION OF CONFORMITY (CE)

Declaration of conformity

CE

Manufacturer:	Teseq AG
Address:	Nordstrasse 11F, 4542 Luterbach, Switzerland
	declares that the following product
Product:	INA 703 / Magnetic Field Coil
Options:	all
	conforms to the following Directives and Regulations
	EMC Directive 2004/108/EEC LVD Directive 2006/95/EEC
Generic standards:	EN61326-1, 2005 EN61326-2-1, 2005 EN61010-1, 2001
	The relevant technical file is available for inspection:
Technical file:	N° EMC_INA703_2012/ LVD_INA703_2012 Teseq AG CH - 4542 Luterbach

The purpose of this instrument is the generation of defined interference signals for EMI immunity testing. Depending on the arrangement of the test rig, the configuration, the cabling and the properties of the EUT itself, a significant amount of electromagnetic radiation may result that could also affect other equipment and systems. The user himself or herself is ultimately responsible for the correct and controlled operation of the rig. In case of doubt, the tests should be carried out in a Faraday cage.

European representative:	Teseq AG, Nordstrasse 11F, 4542 Luterbach, Switzerland
Place and Date:	Luterbach, March, 7, 2012

Johannes Schmid
President

6 OPTIONS AND ACCESSORIES

6.1 INA 703 stand

6.2 INA 703 coil

INA 703 Magnetic field coil

6.3 INA 3250 Interconnection cable

To interconnect INA 703 with Teseq ProfLine system for IEC 61000-4-8 testing.

6.4 INA 3251 Interconnection cable

To interconnect INA 703 with Teseq MFO 6501 or MFO 6502 for IEC 61000-4-8 testing.

7 SYSTEM DESCRIPTION

Technical specifications	
Coil size:	1 x 1 m
Homegen field volume:	60 x 60 x 50 cm
Base:	Strong aluminum with rolls
Max vertical positioning Height:	130 cm
Turns:	1, 5, 37
Max supply frequency current cont:	10 A
Max supply frequency current short (3 s):	35 A
Max supply frequency field strength cont:	330 A/m
Max supply frequency field strength short (3 s):	1100 A/m
Weight:	25 kg
Accessories	
Connection cable for INA 2141:	INA 3250
Connection cable for MFO 6501 or 6502:	INA 3251
Manual current source (4 A):	MFO 6501
Automatic current source (4 A):	MFO 6502
Automatic current source (30 A):	NSG 1007 - 5 kVA or higher
Other coil models	
INA 701 – single turn coil	
INA 702 – multi turn (1 turn, 11 turns) coil	

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